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(54) **HYBRID STEPPING MOTOR**

(57) Abstract:

PROBLEM TO BE SOLVED: To enhance response by reducing the inertia of a rotor part and to avoid the increase in mechanical dimensions by the use of an auxiliary mechanism such as an encoder by using the rare earth having large magnetic force as a permanent magnet, making the diameter of a rotor shaft large and making the inside hollow.

SOLUTION: In this hybrid-type stepping motor, the inner diameter of an annular permanent magnet 15 is made larger than that in a conventional motor, and the thickness is made thin. At the same time, the diameter of a part of a rotor shaft 16 in a motor main body is made to be the diameter in correspondence with the shape of the permanent magnet 15. Furthermore, that part is made hollow. As the permanent magnet 15, rare earth having large magnetic force is used. Furthermore, the inner diameters of ring-shaped rotor cores 18A and 18B, which are attached to both ends of the rotor shaft 16, are made to be the diameter in correspondence with the size of the permanent magnet 15. Furthermore, the rotor cores 18A and 18B are attached to a hollow part 17 of the rotor shaft 16 so that one core is shifted by 360/2n to the other core.